CLAIMS

1. A heterojunction bipolar transistor comprising:

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a base having a concentration of a first material at a first depth, said concentration of said first material impeding diffusion of a base dopant, wherein said first material causes a change in band gap at said first depth in said base;

said base having a concentration of a second material, said concentration of said second material increasing at said first depth so as to counteract said change in said band gap.

2. The heterojunction bipolar transistor of claim 1 wherein said first material is carbon.

3. The heterojunction bipolar transistor of claim 1 wherein said base dopant is boron.

4. The heterojunction bipolar transistor of claim 1 wherein said first material is carbon and wherein said base dopant is boron.

5. The heterojunction bipolar transistor of claim 1 wherein said first material causes an increase in said band gap at said first depth in said base.

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6. The heterojunction bipolar transistor of claim 5 wherein said concentration of said second material increases at said first depth by an amount required to cause a decrease in said band gap to be substantially equal to said increase in said band gap caused by said concentration of said first material.

7. The heterojunction bipolar transistor of claim 5 wherein said concentration of said second material increases at said first depth by an amount required to cause a decrease in said band gap to be equal to said increase in said band gap caused by said concentration of said first material.

8. The heterojunction bipolar transistor of claim 5 wherein said first material is carbon and wherein said second material is germanium.

9. The heterojunction bipolar transistor of claim 1 wherein said heterojunction bipolar transistor is an NPN silicon-germanium heterojunction bipolar transistor.

10. The heterojunction bipolar transistor of claim 1 wherein said band gap decreases at a linear rate between a second depth in said base and a third depth in said base, wherein said first depth is situated between said second depth and said third depth.

11. The heterojunction bipolar transistor of claim 10 wherein said concentration of said second material is equal to 0.0 atomic percent at said second depth.

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12. A method for fabricating a heterojunction bipolar transistor, said method comprising steps of:

adding a concentration of a first material to a base at a first depth in said base, said concentration of said first material impeding diffusion of a base dopant, said first material causing a change in band gap of said base;

increasing a concentration of a second material at said first depth in said base so as to counteract said change in said band gap.

13. The method of claim 12 wherein said first material is carbon.

14. The method of claim 12 wherein said first material impedes diffusion of boron in said base.

15. The method of claim 12 wherein said first material is carbon and wherein said first material impedes diffusion of boron in said base.

16. The method of claim 12 wherein said first material causes an increase in said band gap at said first depth in said base.

17. The method of claim 16 wherein said concentration of said second material is increased at said first depth by an amount required to cause a decrease in said band gap

to be substantially equal to said increase in said band gap caused by said concentration of said first material.

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18. The method of claim 16 wherein said concentration of said second material is increased at said first depth by an amount required to cause a decrease in said band gap to be equal to said increase in said band gap caused by said concentration of said first material.

19. The method of claim 12 wherein said heterojunction bipolar transistor is an NPN silicon-germanium heterojunction bipolar transistor.

20. The method of claim 12 further comprising a step of decreasing said band gap between a second depth in said base and a third depth in said base, wherein said first depth is situated between said second depth and said third depth.

21. The method of claim 20 wherein said band gap is decreased between said second depth and said third depth by increasing said concentration of said second material between said second depth and said third depth, wherein said concentration of said second material is equal to 0.0 atomic percent at said second depth.